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a valuable paper on "The various forms of Trichomes of *Echinocystis lobata*," in the March *Botanical Gazette*. It is accompanied by a plate with nine figures.——In the March *Torrey Bulletin*, J. B. Ellis hazards the belief that Coleosporium of Solidago (*Uredo Solidaginis* Schw.) is the rudimentary stage of the Dothidea (*Sphæria Solidaginis* Schw.) common somewhat later in the season on the same leaves.——In the same number a translation appears of Dr. Herpell's method of preparing the fleshy fungi for the herbarium. The essential features of the process are these: Stout sheets of paper are coated over with gelatine. The fungus is cut into thin longitudinal sections and these are laid upon a moistened sheet and afterwards placed in an ordinary press. Such preparations are said to retain their colors excellently.

ZOÖLOGY.

NEW TEXAN UNIO.—The following description is based upon a series of shells received from the late Prof. Boll, of Dallas, Texas. They were collected by him in the last trip but one made in the interests of science. With them came a number of other Texan forms, perhaps all referable to described species and of great interest from the light they throw on geographical distribution, and the variations to which the Unionidæ are subject, dependent thereon. It is hoped to make them the subject of a future communication.

Unio bollii (sp. nov.).—Testa lævi, sub-rotunda, ventricosa, subinæquilaterali, postice obtuse angulata, antice rotunda; valvulis crassissimis, antice paulisper crassioribus, postice ad dorsum paululum tuberculatis; natibus subelevatis, tumidis, ad apices valde granulatis; epiderme pallido-lutea usque albofusca aut viridicante, eradiata; dentibus cardinalibus magnis, erectis, acuminatis crenulatisque; lateralibus sublongis, crassis rectisque; margarita alba et postice iridescente.

Shell smooth, rather rounded, inflated, somewhat inæquilateral, obtusely angular behind, rounded before; valves very thick, thicker before, behind on dorsal aspect very little tuberculated; beaks somewhat raised and swollen, much granulated at the tips; epidermis pale yellow to light brown, or greenish, without rays; cardinal teeth large, erect, acuminate and crenulate; lateral teeth rather long, thick and straight; nacre white and iridescent posteriorly. Diameter 1.5 in., length 2.75 in., breadth 3.12 in.

Habitat, Colorado river, Texas. J. Boll. My cabinet, and cabinet of Arthur F. Gray.

Shell smooth, rather rounded, inflated, somewhat inæquilateral, obtusely angular behind, rounded before; substance of shell very thick, thickened anteriorly, on dorsal aspect, posteriorly, a number of small tubercles with a tendency to arrangement in rows; beaks somewhat raised and tumid, much granulated at the tips; ligament long, thick, in color partaking of the general character of the epidermis; the latter pale yellow to light brown, with a greenish cast, without rays, but with very marked darker concentric lines of growth moderately distant, umbonial slope rounded; posterior slope raised and broad, slightly sulcate near dorsal aspect, where are rather numerous small pustules; cardinal teeth heavy, erect, acuminate, crenulate, double in the right valve, with a third accessory small tooth in the sinus of the major divisions, single in the left valve with sinus corresponding to the small third tooth of the right valve; lateral teeth rather long, thick, crenulate and straight; anterior cicatrices distinct, deeply impressed, that of the adductor muscle especially so and extending very nearly to dorsal margin; posterior adductor cicatrix rather deeply impressed, confluent with posterior retractor impression, the latter above, deep, at extreme end of lateral teeth; dorsal cicatrices at unequal distances along the anterior aspect of the cavity of the beaks, the last near the *protractor pedis* impression; pallial impression deep for the anterior two-thirds of its length; cavity of the beaks deep and triangular; of the shell deep and rounded; nacre milky white and iridescent posteriorly.

Observations.—This is a very distinctly marked species, not easily confounded with any other Texan shell. It is, perhaps, allied to *U. quadrans* Lea, but differs in the following constant characters: It is not quadrate, has a much lighter epidermis, heavier teeth, the erect cardinal teeth, the tuberculated posterior slope, the shape and depth of the cavity of the beaks, and the distinct anterior cicatrices.

The species is dedicated to the late Professor Jacob Boll, in memory of his services to science, he having done not a little to foster a love for natural history in his adopted State of Texas.—*R. Ellsworth Call, Des Moines, Iowa.*

NOTE ON SUCCINEA CAMPESTRIS AND S. AUREA.—A gentleman residing in Illinois, recently sent me a number of land and marine shells for determination, collected in November, 1880, in the vicinity of New Orleans, Louisiana, and on the main-land of Florida and Cedar Keys. Among the land shells collected by him at New Orleans, was *Succinea campestris* Say. In Part I, of "Land and Fresh Water Shells of N. A.," published by the Smithsonian Institution in 1869, Mr. Binney assigns as the geographical range of this species the States of Florida and Georgia, remarking that it has been "observed as yet only" in those States. The specimens under consideration are, beyond doubt, *campestris.* Mr. Binney repeats the same remark in Vol. V of his recent "Terrestrial Air-breathing Mollusks," page 427, published in 1878, by the Museum of Comparative Zoölogy, as Vol. IV of its Bulletin. The species was sent me from Charleston, S. C., in the summer of 1877. These two localities will therefore extend its geographical limits both to the north and west. It will probably be found also at intermediate points in Mississippi and Alabama.

In both of the works quoted the distribution of *Succinea aurea* Lea, is limited to the State of Ohio. It is remarked by Mr. Binney, " a species of the interior region, but restricted as far as yet known to Ohio." There are, in my collection, specimens of this beautiful species from three separate localities in that State. But there are also specimens from the interior of New York, collected by me at Richfield Springs, Otsego county, in July, 1877. In the Bulletin of the Buffalo Society of Natural Sciences for August, 1874, is printed a paper on " Land and Fresh Water Shells of the State of New York," by the late Dr. James Lewis. On p. 133, he quotes *S. aurea* from Staten Island on the authority of S. Hubbard, but quotes it with a question mark, and in parenthesis, says, " Probably not authentic." He also quotes the species, on the authority of himself, from Little Lakes, with the remark, "Probably not clearly identified." The locality last named is but a few miles from Richfield Springs, and is in the same county. But, beyond a doubt, *S. aurea* does occur at both of those localities. The specimens collected by me thoroughly satisfied Dr. Lewis that *aurea* really belonged to the New York fauna. He so labeled some I gave him; and a recent very careful comparison with typical forms from Ohio affords conclusive proof of specific accuracy. The geographical limits of this last named species must, therefore, be greatly extended, and made to include Western and Central New York.

It might also be added to these new localities for well known shells, another locality for *Unio pressus* Lea. It was collected by me in the Des Moines river, in August, and in the Nishnabotna river, in the extreme south-west of Iowa, in September last. This species, therefore, ranges from Whitehall, in New York, to Fremont county, Iowa, and may be discovered yet farther west.—*R. Ellsworth Call, Des Moines, Iowa.*

THE ENGLISH SPARROW IN ILLINOIS.—In relation to the curious habit of the English sparrow reported by Mr. Gillman, in the February number of the NATURALIST, attention is called to the following statement, translated from a little book on native German mammals and birds :[1]

" To begin with the spring, we must give especial prominence to the fact that the sparrow, at the very time when it engratiates itself with the gardener as a protector of his fruit trees, also enrages him by wantonly biting off the buds of the leaves and the blossoms. This mischief appears to us to be done chiefly as a pastime, for the bird carries the plucked bud for a long time here and there in its beak, and finally lets it fall.

" Whether the discovery of a worm in a bud * * * does not also, in many instances, induce the sparrow to extend its search to the soundest buds, is a question which we will not attempt to decide."

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[1] *Die einheimischen Säugethiere und Vögel, nach ihren Nutzen und Schaden in der Land und Forstwirthschaft.* Von ADOLF und KARL MULLER. Leipzig, 1873.

The thorough examination of the food and food habits of the English sparrow which is certain to result from the intense and universal interest the little stranger has awakened, will give us a mass of valuable facts for comparison with those accumulated in Europe, where the debate concerning the good and evil of its life has been vigorous and long-continued. We shall thus be able to trace much more fully and exactly, than has ever yet been done, the effects of widely changed conditions upon the alimentary regimen of a bird.

Now that the stage of more or less ignorant and passionate discussions and personal vituperation seems nearly to have passed, contributions of fact will probably not be unwelcome. I add a few notes on the food of twenty-five birds shot in and around Aurora, Ill., in September, of two successive years, 1879 and 1880.

The elements of the food at this time were quite few and simple, consisting almost wholly of fragments of grain picked up on the streets and of the seeds of a few of the commonest grasses. At a time when thirty per cent. of the food of the robin, twenty per cent. of that of the catbird, and ninety per cent. of that of the blue bird consisted of insects, no insects were found in the stomachs of these birds except traces of three grasshoppers, making perhaps six per cent. of the food. Fragments of corn, wheat and oats amounted to about forty per cent., and the seeds of grasses to as much more. The common pigeon grass (*Setaria viridis*) was much the most abundant species; but *S. glauca* and *Panicum sanguineum* occurred quite frequently, and three or four species of Panicum and Eragrostis, which I did not determine, were also present in small quantity. One bird had eaten many hemp seeds, five had taken a very few seeds of "smartweed" (Polygonum), and two had eaten little else than the seeds of the common garden sunflower.—*S. A. Forbes*, *Normal*, *Ill.*

THE RED-WINGED STARLINGS generally leave this region before we have any severely cold weather. After the breeding season is over they congregate in vast flocks, which sometimes almost darken the air. They used to eat our corn in the fields to a damaging extent, but for several years I have heard no complaints on this score. It would seem that they are gradually abandoning this habit, possibly from having found some other supply of food. It used to be customary for the farmers to complain of their depredations and often shoot them. One enterprising legislator even tried to get a law passed, offering a bounty for their wholesale destruction. But better sense prevailed with the majority of the members. During the third week of last December I noticed about a dozen of these birds, which from some cause or other had remained with us. Below a neighboring mill dam the water flowed out, making a small brook. These birds were wading about in the shallow water, apparently in search of something for food. When any one approached too closely they flew into the tree-tops near by, returning as soon as they were left unmolested. They continued this unusual habit for a week or more, but finally left us a few days before Christmas.—*Charles Aldrich, Webster City, Iowa, Jan. 7, 1881.*

THE INDIGO BIRD.—Writers on the ornithology of this section seem to convey the idea that this beautiful little bird (*Cyanospiza cyanea* Baird) is not common here. I think this is an error. I have frequently seen them in spring and early summer, and while I have never looked for their nests, I have had no doubt that they breed in the thickets and groves along Boone river. I used to see one quite often, which appeared to me to be a little trifle lighter in color than those generally met with. The blue was paler. I have seen him and heard him sing for several days in succession, and as I observed his peculiarity of color, there could be little doubt regarding his identity as one and the same bird. This was on the border of a crab-apple and hazel brush thicket, and the nest would no doubt have been found by searching for it. I see them so often about the time of breeding that I have never doubted that this region may be set down as one of their regular habitats.—*Charles Aldrich, Webster City, Iowa, 1881.*

ZOOLOGICAL NOTES.—The process of self-division in *Euglypha alveolata*, a flagellata infusorian, has been observed and illustrated by Dr. August Gruber.——A very large ascidian (*Ciona ocellata* Agassiz) has been discovered by Professor Verrill in abundance on the rocks and wharves at Newport, R. I. It is our largest and most elegant ascidian, but rare and very local in its distribution. It will be remembered that the European *Littorina littorea* was introduced on the shores of Maine, about 1868, but at a much earlier date on the shores of Nova Scotia. During the winter of 1879–80, it was found by Professor S. I. Smith, of New Haven. Two other littoral species of European shells, not before recorded as American (*Truncatella truncatula* and *Assiminia grayana*), were found by Professor Verrill at high water, among the docks at Newport.——Professor Semper's book, entitled The Natural Conditions of Existence as they affect animal life, has been published and will deserve a wide circulation. It is favorably reviewed in *Nature*, by Professor Ray Lankester, who, however, finds fault with the orthodoxy of Semper's Darwinism. It is evident that we are to have sects and sectarianism among evolutionists. We had supposed that Mr. Darwin had modified his own Darwinism, certainly among evolutionists Darwinism, as such, is being replaced by a modern type of Lamarckianism, as in our opinion it should be.——A Hymenopterous parasite has been hatched from larvæ found on two spiders (Linyphia); the larvæ were apodous and adhered to the abdomen of the spider, which, when full-grown, they fully equaled in size.——The embryology of Selachians (Acanthias) has been recently studied by Dr. H. Rabl-Rückhard, of the Berlin Museum, with a view (1) to determine the cephalic ending of the notochord in its relations towards the hypophysis cerebri and the so-called middle trabecula, and (2) the origin of the pineal gland. He finds that at no period has the embryo of Acanthias a notochord with its apex projecting beyond that part of the base of the skull, which subsequently becomes the dorsum sellæ, thus confirming the views of W. Müller, Balfour and Parker; though this view is not irreconcilable with the view of Reichert, that the notochord of young sharks at a certain period of development reaches to the frontal wall. ——As regards the comparison of the brains of the higher vertebrates with the lower, which is in controversy, by ascertaining the true position of the pineal gland, we advance towards a true solution of the difficulty. Rabl-Rückhard confirms the views of Balfour and Ehlers that in sharks this gland is developed just as in higher vertebrates, as Stieda insists, in all higher adult vertebrates it lies dorsally between structures which correspond to the primary first and second cerebral vesicles.——Professor His, studying the question as to the development of a tail in the human embryo, disputes that it has at first a true tail, as it possesses no supernumerary vertebræ, and in pathology no extra number have ever occurred.

ENTOMOLOGY.[1]

Exuviation in Flight.—Mr. R. McLachlan has recorded a remarkably numerous flight of the Ephemerid, *Oligoneura rhenana*, last August, at Basle, Switzerland, with the interesting observation that it casts the subimaginal skin while on the wing. We have often met with just such swarms of Ephemerids as Mr. McLachlan describes, flying either against the wind or against the current of a river. In the case of *Polymitarcys alba* (Say), which is extremely common on the Red river of the north, where in August, 1877, we found it actually giving the river a white appearance, and falling upon vessels like snow, the subimaginal skin was shed in an incredibly short space of time (less than a minute), but was almost invariably preceded by a brief period of rest. The impatience to fly off after the true wings were withdrawn, however, was such that in the large majority of cases the insect took wing before the subimaginal skin was fully cast, in which case exuviation would be completed on the wing. We cannot conceive of the beginning of the process taking place on the wing, for there is a period, however short, from the bursting of the skin on the thorax to the extraction of the wings from their covering, when the use of the wing, it seems to us, is impossible; and we can conceive of full exuviation in the air only on the hypothesis that the insect during the process descends from a sufficient altitude to afford time for the extraction of the new wings.

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[1] This department is edited by Prof. C. V. Riley, Washington, D. C., to whom communications, books for notice, etc., should be sent.